

# NATURAL HISTORY MISCELLANEA

Published by

**The Chicago Academy of Sciences**

Lincoln Park - 2001 N. Clark St., Chicago 14, Illinois, U.S.A.

---

No. 131

March 23, 1954

---

## **Some Indications of Survival Value in the Type "A" Pattern of the Island Water Snakes of Lake Erie'**

Joseph H. Camin, Charles A Triplehorn<sup>3</sup> and Harold J. Walter<sup>4</sup>

On April 30, 1949, seven members' of the Ohio State Herpetological Society collected several hundred water snakes, *Natrix sipedon insularum* Conant and Clay, on Middle Island, a small member of the archipelago at the western end of Lake Erie. This island is in Canadian waters, just a few hundred yards from the U. S.-Canadian border. It is approximately three-quarters of a mile long from east to west, little more than 300 yards wide in the north-south direction, and covered by a rather thin layer of top-soil with a good, but not dense, stand of vegetation. The periphery of the island is strewn with large, flat, limestone rocks interspersed with a few small, pebble beaches. The snakes were often taken in groups of twenty or more under the larger rocks and were apparently just emerging from hibernation. Most of them were collected under rocks along the shores of the island, but many, especially the juveniles, were found in small rock piles and brush piles away from the water.

Of the snakes collected, 254 were segregated according to size into a juvenile group and an adult group. The 123 juveniles were all under 20 cm. in length and were judged to have been born the previous year. The adult group was composed of 131 specimens measuring from 46 to 130 cm. in length, most of them over 60 cm.

---

<sup>1</sup> A contribution from the Department of Zoology and Entomology, the Ohio State University, Columbus, Ohio.

<sup>2</sup> The Chicago Academy of Sciences.

Department of Entomology, University of Delaware, Newark.

<sup>4</sup> Museum of Zoology, University of Michigan, Ann Arbor.

The authors plus Paul R. Camin, Gail R. Norris, Eldon Reed, and Thad E. Thorson.

The two groups were then further segregated according to pattern, using the code of Conant and Clay (1937) with some modifications. In their description of *Natrix sipedon insularum*, Conant and Clay designated type "A" as the typical island pattern, a uniform, light, limestone gray to beige without markings of any kind; type "D" as the typical mainland pattern, usually well-marked, except in the oldest individuals, with dark brown to black bands on a lighter brown or gray background; and types "B" and "C" as the patterns between the two extremes. The present authors were unable to place all intergrades indisputably in the "B" and "C" categories, and, therefore, three additional types were used. These have been designed as type "ab," which falls between "A" and "B," but cannot be called either without question; type "bc," between "B" and "C"; and type "cd," between "C" and "D." Furthermore, various combinations of dorsal and ventral patterns, such as a type "B" dorsum and a type "C" venter, were found to be present on the same individual. For this reason it was found to be less confusing to ignore the ventral surface in the classification of the various types, using it as a guide only in the few cases in which it was difficult to classify the dorsal pattern. The pattern distribution in adults and juveniles was as is shown in Table I.

**Table I. Pattern types of island water snakes**

	A	ab	B	bc	C	cd	D	Total number
Adults	50	39	16	7	10	9	0	131
Juveniles	26	23	23	17	18	16	0	123
Total	76	62	39	24	28	25	0	254

As an examination of Table I reveals, there were no typical mainland specimens, type "D," found on Middle Island, which lies approximately twelve miles north from the Ohio mainland. It will be noted that the juveniles from the island exhibit the same range of patterns that are found in the adults. Although there is some slight obscuration of the pattern with maturity, there is no evidence that the pattern ever changes from one type to another during the life-time of an individual snake.

A chi-square analysis of the data presented in Table I revealed a very significant difference, at much less than the one per cent level of probability, between the adult and the juvenile groups. The evidence indicates that a much higher percentage of typical *insularum* and intermediate individuals approaching the type "A" pattern are surviving to maturity than are the forms approaching the typical *sipedon* pattern.

If predation is the selective influence, the reason for the correlation between pattern and survival may be found in the fact that the snakes with the unbanded, limestone gray, dorsal coloration are well camouflaged

when resting on the limestone rocks of the island's periphery, whereas the darker, banded individuals can be seen more easily and at comparatively greater distances.

The herring gulls, which occur in abundance in the vicinity of the islands, may possibly be at least partially responsible for the predation on the juvenile water snakes. However, during their few hours' stay on the island, the writers did not observe any activity of this nature. Further investigation will be necessary before any conclusive statements can be made regarding the actual cause of the apparent selection which favors the island water snakes of the Lake Erie islands.

Meanwhile, it is suggested that predation, perhaps by the herring gull or other birds, may constitute an important factor in retarding or preventing the establishment of the mainland snake, *Natrix sipedon sipedon*, on the islands and in the resultant survival of the island subspecies, *Natrix sipedon insularum*, which may be a relict form in this area. If, on the other hand, *insularism* is a recent invader, an aberrant form from the mainland population, or a mutant form from an originally *sipedon*-type that once populated the islands, then the same factors could have operated in favor of the establishment of the island subspecies.

The authors wish to express their sincere appreciation to Roger Conant, Philadelphia Zoological Garden, and Edward S. Thomas, Ohio State Museum, for their critical readings of the manuscript.

#### Literature Cited

Conant, Roger and William M. Clay

- 1937      A new subspecies of water snake from islands in Lake Erie. Occ. Papers Univ. Mich. Mus. Zool., no. 346, p. 1-9, pl. 1-3.

*Natural History Miscellanea*, a series of miscellaneous papers more or less technical in nature, was initiated by The Chicago Academy of Sciences in 1946 as an outlet for short, original articles in any field of natural history. It is edited by the Director of the Academy with assistance from the Scientific Governors' Committee on Publications and other qualified specialists. Individual issues, published at irregular intervals, are numbered separately and represent only one field of specialization; e.g., botany, geology, entomology, herpetology, etc. The series is distributed to libraries and scientific organizations with which the Academy maintains exchanges. Title pages and indexes are supplied to these institutions when a sufficient number of pages to form a volume have been printed. Individual specialists with whom the Academy or the various authors maintain exchanges receive those numbers dealing with their particular fields of interest. A reserve is set aside for future exchanges and a supply of each number is available for sale at a nominal price. Authors may obtain copies for their personal use at the prevailing rates for similar reprints.

When citing this series in bibliographies and in preparing abstracts, authors are requested to use the following preferred abbreviations: *Chicago Acad. Sci., Nat. Hist., Misc.*

**H. K.** Gloyd, Director

*Committee on Publications:*

Hanford Tiffany, **C. L.** Turner, and William E. Powers.